

CLAIMS

1. A jacking tool for removing a die button in a body die comprising:
an elongate substantially cylindrical dowel having first and second ends
and an internally threaded bore extending between and opening at both of said
5 ends; and
a foot integral with said dowel and positioned proximate an end thereof,
said foot having a top face adapted to engage a substantially complementary
surface on a die button.
- 10 2. The jacking tool of claim 1 wherein said bore is internally threaded
substantially along an entire length thereof.
3. The jacking tool of claim 1 wherein said foot comprises arcuate outer
faces oriented substantially perpendicular to said top face.
- 15 4. The jacking tool of claim 3 wherein a portion of said foot and a portion of
said dowel proximate said second end are volumetrically reduced by burning.
5. The jacking tool of claim 1 wherein said bore includes a threaded portion
20 and an unthreaded portion; and
wherein a diameter of said unthreaded portion does not exceed a distance
between opposed thread grooves in said threaded portion.
6. A method of extracting a die button from a body die comprising the step
25 of:
forming a step on a substantially cylindrical die button, wherein the step
comprises a substantially planar face oriented substantially parallel with a top face
of the die button.
- 30 7. The method of claim 6 wherein the substantially planar face is located
proximate an end of the die button opposite said top face.

- 8 The method of claim 7 further comprising the step of:
 positioning a jacking member in intimate association with the die button,
 the jacking member comprising a locating dowel and a foot integral
 therewith that extends under the step on the die button and engages the
 5 substantially planar face.
9. The method of claim 8 wherein the jacking member comprises an at least
 partially threaded longitudinal bore in the locating dowel.
- 10 10. The method of claim 8 wherein the bore extends completely through the
 dowel and opens at opposite ends thereof.
11. The method of claim 9 further comprising the step of:
 threadedly engaging an elongate threaded member in the bore; and
 15 providing an axial force to the dowel via an interface of threads on said
 elongate threaded member with threads in said bore, thereby providing a lifting
 force on said die button via said substantially planar face for extraction of said
 button from the body die.
- 20 12. The method of claim 11 wherein the step of providing an axial force to the
 dowel comprises:
 exerting an axial pulling force on said dowel substantially without relative
 rotation between said dowel and said elongate threaded member.
- 25 13. The method of claim 11 wherein the step of providing an axial force to the
 dowel comprises:
 exerting an axial pulling force on said dowel by rotating the elongate
 threaded member relative thereto substantially without relative axial displacement
 between said elongate threaded member and the body die, thereby jacking the
 30 dowel and die button from the body die.

14. The method of claim 8 further comprising the steps of:
 inserting an elongate member into a bore in the dowel, and engaging the
 elongate member therein; and
 providing an upward force on the dowel via the elongate member, thereby
 5 lifting the button member from the body die.

15. A button assembly for a metal stamping or punching apparatus having a
 reciprocable punch and a body die, the button assembly comprising:
 a button positioned in the body die, said button having a locating groove
 10 and a volumetrically reduced region; and
 a jacking member engageable with said button, said jacking member
 comprising a foot that extends into said volumetrically reduced region, and a
 dowel complementary with said groove;
 wherein said dowel comprises a bore extending completely therethrough
 15 said dowel being adapted to threadedly receive an elongate member for providing
 an upward force to said dowel, thereby extracting said button via said foot from
 the body die.

16. The button assembly of claim 15 wherein said foot includes a substantially
 20 planar top face and an inner face perpendicular to said top face, said foot further
 including arcuate outer faces.

17. The button assembly of claim 15 wherein an exterior surface of said
 button defines a first radius, and wherein said foot defines a second radius that is
 25 smaller than said first radius.

18. The button assembly of claim 15 wherein the button is substantially
 cylindrical and includes a first end having a shaped recess for receipt of a
 substantially complementary punch; and wherein
 30 the volumetrically reduced region is located at a second end of the button
 opposite said first end and is a substantially right-angled step.

19. The button assembly of claim 15 wherein the button comprises first and second locating grooves positioned on substantially opposite sides thereof.